



## Worksheet 2 Number systems, ASCII and Unicode

### Task 1

1. Convert the following decimal values into 8-bit binary bytes:

a)  $10_{10}$

b)  $104_{10}$

c)  $255_{10}$

2. A single byte can be used to represent the decimal values  $0_{10}$  to  $255_{10}$ . For values over  $255_{10}$ , bytes can be joined together. In a computer that has a 16-bit bus width, an integer would be stored in two consecutive bytes.

For example, to represent  $654_{10}$  the two bytes used would be:

Byte 2								Byte 1							
$2^{15}$	$2^{14}$	$2^{13}$	$2^{12}$	$2^{11}$	$2^{10}$	$2^9$	$2^8$	$2^7$	$2^6$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
0	0	0	0	0	0	1	0	1	0	0	0	1	1	1	0

Convert the following denary values into 2 bytes:

a)  $127_{10}$

b)  $3188_{10}$

c)  $65535_{10}$

3. Put the following byte prefixes in order of size from smallest to largest:

**mega   gibi   kibi   tebi   kilo   giga   tera   mebi**

Prefix	Symbol	Number of bytes
	k	1,000
	Ki	1,024
	M	1,000,000
	Mi	1,048,576
	G	1,000,000,000
	Gi	1,073,741,824
	T	1,000,000,000,000
	Ti	1,099,511,627,776



### Task 2 Representing characters

1. Using the 'ASCII codes' helpsheet, answer the following questions:

a) What is your forename in ASCII?

b) Convert the following ASCII sentence to text:

010001 00	010011 10	010000 01	001000 00	011101 11	011000 01
011100 11	001000 00	011001 00	011010 01	011100 11	011000 11
011011 11	011101 10	011001 01	011100 10	011001 01	011001 00
001000 00	011010 01	011011 10	001000 00	001100 01	001110 01
001110 00	001101 00	001011 10			

c) Explain why when adding the characters '2' + '3' you don't get 5:

2. Create a spreadsheet that can convert a word of up to 8 characters into ASCII character codes. (Use the menu option Formulas, Show formulas or press Ctrl + ` to display the formulas in a spreadsheet.. The ` character is the top leftmost key on the keyboard.)

	A
1	a
2	=CODE(A1)
3	=DEC2BIN(A2,8)

## Worksheet 2 ASCII and Unicode

### Data types



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Extend the spreadsheet to convert ASCII binary codes back to regular characters.

5	1100001
6	=BIN2DEC(A5)
7	=CHAR(A6)